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HOT-FILLABLE PLASTIC CONTAINER WITH INTEGRATED HANDLE**FIELD OF THE INVENTION**

This invention relates to a blown plastic container with an integrated handle or gripping feature that does not involve the use of an opening that extends through the container. More particularly, this invention relates to a hot-fillable container of the foregoing description that is well-suited for manufacturing in large sizes, for example, sufficiently large to contain 48 – 64 oz. liquid therein while not requiring a gripping portion of a width that is excessive for persons with small hands.

BACKGROUND OF THE INVENTION

U.S. Patent 5,472,105 Krishnakumar, et al., the disclosure of which is incorporated by reference herein, describes a hot-fillable container that is blown from a preform of a thermoplastic material, specifically, polyethylene terephthalate (PET), alone or in combination with layers of other materials. The container of the '105 patent, which is taught as being well-suited for the packaging of beverages in 64 oz. sizes, has a generally right circular cylindrical body portion with a circumferentially spaced apart and generally opposed pair of indented panels that flex inwardly, upon the cooling of a filled and capped bottle, to accommodate thermal contraction on the packaged beverage. The indented panels of the '105 patent, which do not form an opening that extends through the container, also serve to provide spaced surfaces that can be grasped between the thumb and fingers of a hand of a user to permit the user to handle the container. Unfortunately, for a large size container of the type taught by the '105 patent, the spacing between the gripping panels, which extend inwardly substantially to the vertical centerline of the container cannot be substantially reduced below about 3.5 in. (about 90mm), which is about 55-70% of the major lateral extent of the container. Individuals with smaller hands may have difficulty in handling a filled container with a gripping feature with such spacing between surfaces to be gripped.

SUMMARY OF THE INVENTION

According to the present invention, there is provided a hot-fillable plastic container for packaging hot-filled beverages in large sizes, the container having an integral handle or hand-gripping feature in which the spacing between opposed gripping surfaces is sufficiently small, for example, no more than about 2.5 in. (about 65mm), which is approximately 45% of the major lateral extent of the container to be grippable by people with small hands. In a first embodiment of the present invention, the hand grip feature is in a non-circular half portion of a body portion of a container whose other half portion is otherwise generally circular in cross section. In this embodiment, the cross section of the body is generally oval-shaped, and the gripping feature, which stops somewhat short of the vertical centerline of the container, is in a smaller diameter end of the container, and, consequently may be held to a dimension that does not exceed 2.5 in. for easy gripping by a consumer with small hands.

In a second embodiment of the present invention, the container may be provided with a generally cylindrical body portion that is generally circular in cross section, without a gripping feature in the body portion, but with an integral gripping portion being provided in an otherwise generally frusto-conically-shaped neck that extends upwardly from the body portion toward a closure-receiving finish portion. The gripping feature in this embodiment is formed by spaced-apart, opposed inwardly extending panels in the neck portion, and these panels need not be spaced apart even by as much as 2.5 in, and can easily be held under 45% of the major lateral extent of the container.

Accordingly, it is an object of the present invention to provide an improved hot-fillable container that is suitable for packaging substantially large volumes of a liquid. More particularly, it is the object of the present invention to provide a container of the aforesaid description with an integral

handle or gripping portion whose opposed, spaced apart gripping surfaces need not be spaced apart by a distance that precludes handling by persons with small hands.

For a further understanding of the present invention and the objects
5 thereof, attention is directed to the drawing and the following brief
description thereof, to the detailed description of the invention and to the
 appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

10 Fig. 1 is a perspective view that is taken from a first direction of a container according to a first embodiment of the present invention;

Fig. 2 is a perspective view that is taken from a second direction of the container of Fig. 1;

15 Fig. 3 is an elevation view of the container of Figs. 1 and 2;

Fig. 4 is a top plan view of the container of Figs. 1-3;

20 Fig. 5 is an elevation view taken at a right angle to the view of Fig. 3 of the container of Figs. 1 – 4;

Fig. 6 is a bottom plan view of the container of Figs. 1-5;

25 Fig. 7 is an elevation view of the container of Figs. 1 – 6 taken at a direction opposed to that of Fig. 5;

Fig. 8 is a sectional view taken on line 8-8 of Fig. 7.

30 Fig. 9 is a perspective view of a container according to an alternate embodiment of the present invention;

- Fig. 10 is a front elevation view of the container of Fig. 9;
- Fig. 11 is a top plan view of the container of Figs. 9 and 10;
- 5 Fig. 12 is a side elevation view of the container of Figs. 9 – 11 taken at a right angle to the view of Fig. 10;
- 10 Fig. 13 is a bottom plan view of the container of Figs. 9 – 12;
- Fig. 14 is a rear elevation view of the container of Figs. 9 – 13; and
- 15 Fig. 15 is a side elevation view of the container of Figs. 9 – 14 taken in a direction opposed to that of Fig. 12; and
- Fig. 16 is a sectional view that is taken on line 16-16 of Fig. 12.

DETAILED DESCRIPTION OF THE INVENTION

A container according to the embodiment of Figs. 1 – 8 is indicated generally by reference numeral 20 in the drawing. The container 20 is made up of a body portion 22 that extends for a substantial vertical distance, for example, about 4 $\frac{3}{4}$ in. for a container 20 designed for the packaging of 64 oz. of a liquid, and the body portion has a slightly enlarged heel portion 24 immediately therebelow. The heel portion 24 has a vertical extent of about 7/8 in. for a 64 oz. container 20, and serves to protect a label (not shown) that maybe applied to the exterior of the body portion 22 from contact with adjacent, like containers 20 during shipping and/or on a retail shelf.

The container 20 has a closure-receiving, externally helically threaded finish portion 26 for receiving an internally helically threaded closure (not shown) after the container 20 is filled with the beverage or other liquid to be packaged therein. Of course, other types of closures, for example, lug style

closures, can be used to close the container 20 after filling, in which case the finish portion 26 will be provided with an external configuration other than that of a helical thread for receiving such a closure. In any case, the container 20 is provided with a generally frusto-pyramidal neck portion 28 extending

5 between the body portion 22 and the finish portion 26, the neck portion 28 having an enlarged cylindrical portion 28a immediately below the finish portion 26, an indented portion 28b immediately below the portion 28a, and a base portion 28c that has a slightly greater lateral extent than the body portion 22, again, to protect a label applied to the body portion 22 from

10 damage as a result of contact with adjacent, like filled containers 20. In that regard, the overall height of a 64 oz. container 20, including a height, of the finish portion 26 of about 1 1/16 in. for a 43mm. threaded closure, is about 10-7/16 in., assuming a maximum width of the base portion 28c of about 5-1/4 in. and a transversely extending minor width of the base portion 28c of about 4-

15 1/4 in.

As described, the container 20 is well-suited for the packaging of juice and other still beverages that are packaged while hot, and because the containers 20 are capped after filling while the contents are still hot, there will be some collapsing of a thermoplastic container after hot-filling and capping

20 due to cooling of the contents. To accommodate such collapsing of a container 20 after hot-filling and capping, circumferentially spaced apart indented panels 22a are placed around the body portion 22 to selectively provide for the inward flexing of the body portion 22 without leading to distortion in its overall configuration or distortion of a label applied thereto.

25 As thus far described, the container 20 maybe blow molded in a single piece from a molded preform or parison of a suitable thermoplastic material, for example, as taught by the aforesaid U.S. Patent 5,472,105. Co-extruded, multi-layer preforms that include innermost and outermost layers of virgin PET with one or more internal layers of an oxygen barrier, for example, nylon

30 or ethylene vinyl acetate (EVA) therebetween, possibly also including a central layer of recycled PET, have been proven to be well-suited for the

packaging of hot-filled juices or other still beverage products, and it is to these packaging applications that the present invention is especially directed.

As is clear from the drawing, for example, from a comparison of Figs. 3 and 5, the container 20 has body and base portions 22, 24 that are non-circular in horizontal configuration, the horizontal configuration or silhouette of the body portion 22, which is similar to that of the base portion 24 immediately therebelow, as can be seen in Fig. 6, being generally that of an oval with a larger diameter, part-circular end 24a on an end thereof and a smaller diameter part-circular opposed end 24b. The body portion 22 also has spaced apart, indented grip panels 22b, 22c extending into the body portion 22 from the smaller diameter end 24b of the body portion 22 and partly to the vertical center line of a container 20. The spacing between the grip panel 22b, 22c need be no more than about 2-1/2 in. for a 64 oz. container as described, as a result of the non-circular configuration of the body portion 22 of the container 20 and the positions of the grip panels 22b, 22c extending in from a smaller diameter end of the container 20. This spacing is substantially smaller than any gripping panel spacing that heretofore has been achieved in a body of a 64 oz. liquid container 20, and this permits convenient and comfortable gripping of the container 20 by engaging the panels 22b, 22c between the thumb and fingers of someone with a small hand.

It is also contemplated that the design of the container 20 maybe adapted to the packaging of a liquid in a smaller volume, for example, 48 oz., by shortening the vertical extent of the body portion 22 of the container 20 without reducing its lateral extent in any direction.

As is shown in Fig. 8, the indented gut panels 22b, 22c are generally concave in configuration, and do not extend to a vertical centerline of the container 20. Further, each of the indented grip panels has a depth D of approximately 0.250 inch, which is substantially less than the depth of a 0.500 – 0.900 inch that is characteristic of prior art, hot-fillable, integral handle or grip plastic containers. With such a gripping panel depth, the container 20 has a grip to major lateral extent (width) ratio, as measured between the depths of

the opposed gripping panels 22b, 22c, of approximately 45%, which is substantially less than that achievable with other known large, hot-fillable, grippable thermoplastic containers.

- A container according to the embodiment of Figs. 9 – 16 is indicated
- 5 generally by reference numeral 40 in the drawing. The container 20 is made up of a body portion 42 that extends for a substantial vertical distance, for example about 4-1/4 in. for a container 40 designed for the packaging of 64 oz. of a liquid, and a body portion 42 with a slightly enlarged base portion 44 immediately therebelow. The base portion 44 has a vertical extent of about
- 10 7/8 in. for a 64 oz. container 40, and serves to protect a label (not shown) that maybe applied to the exterior of the body portion 42 from contact with adjacent like containers 40 during shipping and on a retail shelf. The container 40 has a closure-receiving, externally helically extending threaded finish portion 46 for receiving an internally helically threaded closure (not shown) after the container 40 is filled with a beverage or other liquid to be
- 15 packaged therein. Of course, other types of closure, for example lug-style closures, can be used to close a container 40 after filling, in which case a finish portion 46 will be provided with an external configuration other than that of a helical thread for receiving such a closure. In any case, except as herein
- 20 after described, the container 40 is provided with a generally frusto-pyramidal neck portion 48 between the body portion 42 and the finish portion 46, the neck portion 48 having an indented portion 48b at the bottom thereof, immediately above the body portion 42, with a base portion 48c that has a slightly greater lateral extent than the body portion 42, again, to protect a label
- 25 applied to the body portion 42 from damage as a result of contact with adjacent like filled containers 40. In that regard, the overall height of a 64 oz. container 40, including a height of the finish portion 46 of about 11/16 in. for a 43mm threaded closure. is about 10-3/8 in., assuming a maximum diameter of the base portion 44, which is circular in configuration, of about 4-5/8 in.
- 30 As designed, the container 40 is well-suited for the packaging of juices and other still beverages that are packaged while hot, and, because the

containers 40 are capped after filling while the contents are still hot, there will be some collapsing of a thermoplastic container after hot-filling and capping due to the cooling of the contents. Thus, the body portion 42 of the container 40 is provided with a plurality of circumferentially spaced apart, indented 5 panels 42a, which are placed around the body portion 42 to selectively provide for the inward flexing of the body portion 42 without leading to distortion in its overall configuration or of a label applied thereto.

While the body portion 42 of the container 40 may be, and preferably is, generally circular in cross-section, the neck portion 48 of the container 40 10 is made non-circular in cross-section by the provision of spaced-apart, opposed, inwardly projecting gripping panels 48d, 48e. The gripping panels 48d, 48e, which need not extend to the centerline of the container 40, and need not be spaced apart by even as much as 2-1/2 in., serve to permit grasping of the container 40 between the thumb and fingers of a consumer or 15 other person, even a person with small hands. As shown in Fig. 16, the gripping panels 48d, 48e are concave in configuration with a depth of approximately 0.400 inch. With such a gripping panel depth, the container 40 has a grip to major lateral extent (diameter) ratio, as measured between the depths of the (opposed gripping panels 48d, 48e, of 41%.

As thus far described, either a container 20 or a container 40 maybe 20 blow molded in a single piece from a molded preform or parison of a suitable thermoplastic material. Co-extruded multi-layer preforms that include innermost and outermost layers of virgin PET with one or more intermediate layers of an oxygen barrier, for example, nylon or EVA, therebetween, 25 possibly also including a central layer of recycled PET, have been proven to be well-suited for the packaging of hot-filled juices or other still beverage products, and it is to these packaging applications that this embodiment of the present invention is especially directed. Other thermoplastic materials that are suited for use in the manufacture of thermoplastic containers by blow 30 molding may also be used, and these materials include polyesters, polyolefins, polyethylene napthaletes, nitriles and copolymers thereof.

Although the best mode contemplated by the inventors for carrying out the present invention as of the filing date hereof has been shown and described herein, it will be apparent to those skilled in the art that suitable modifications, variations and equivalents may be made without departing from 5 the scope of the invention, such scope being limited solely by the terms of the following claims and the legal equivalents thereof.